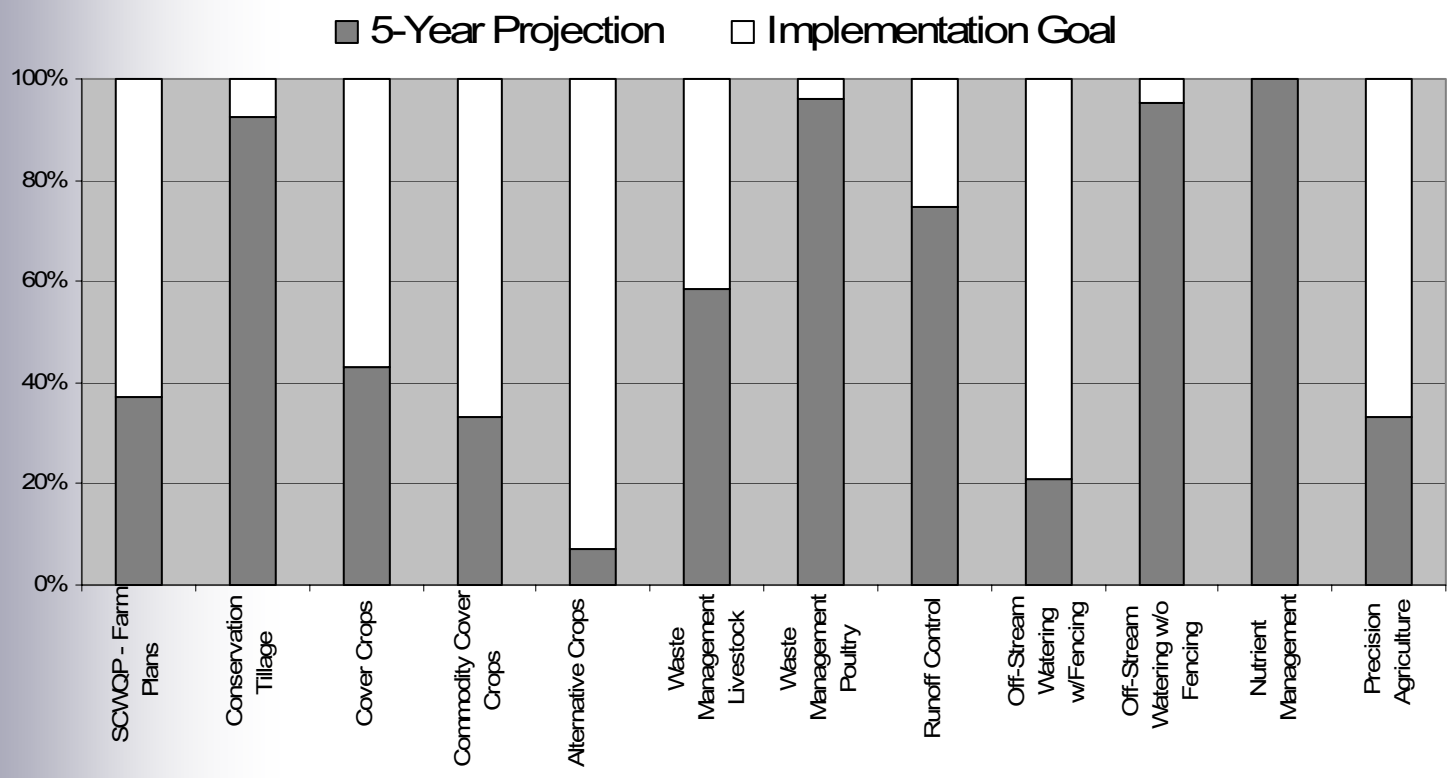
Agriculture Strategy

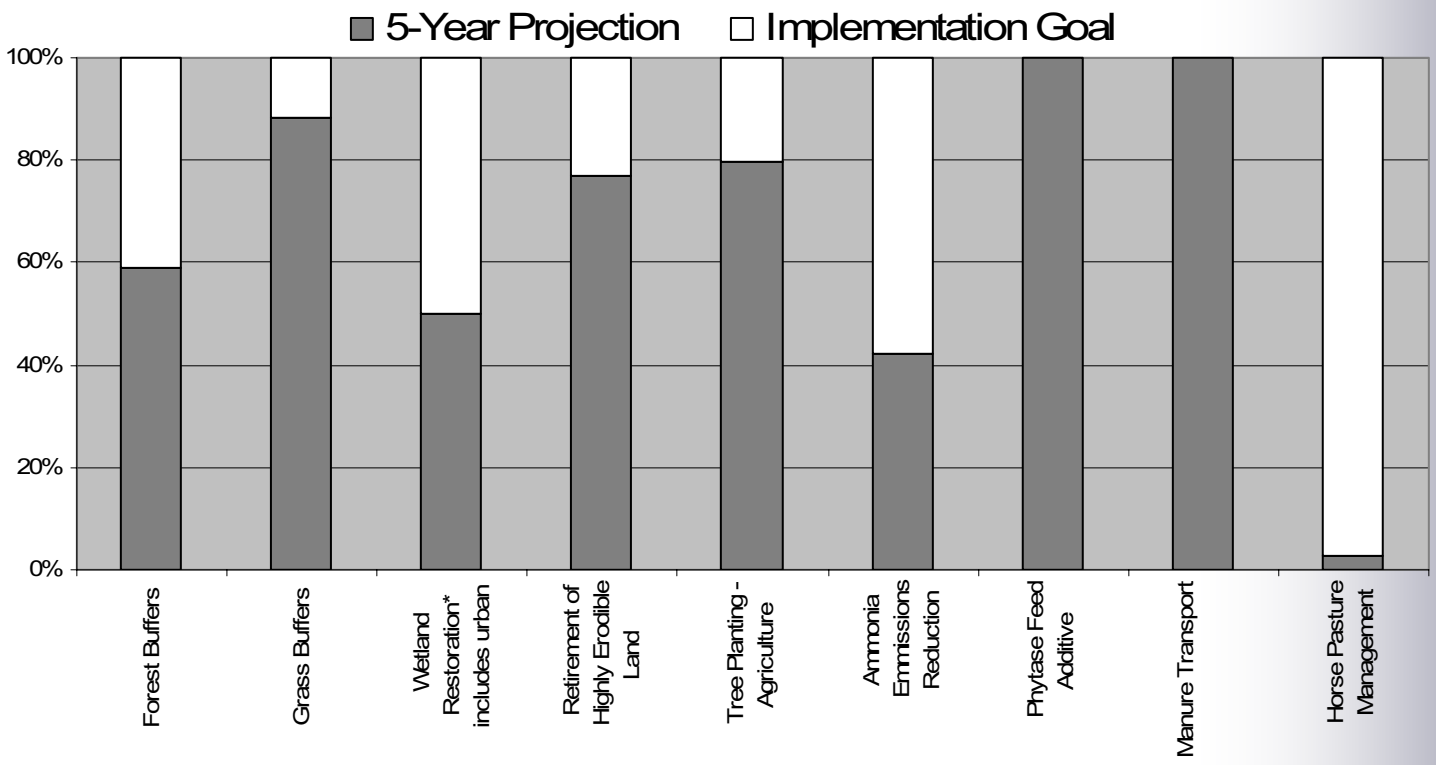
The Agriculture Strategy includes a plan to work with Maryland's farm community to implement a range of BMPs on farmland across the watershed to reduce nutrient and sediment loads. These BMPs are conservation practices that accomplish water quality goals while balancing the needs of crop and livestock production. This strategy has significantly expanded BMP options, including more than 23 different practices that work to protect the soil and natural resources.

Agriculture Implementation Schedule



Note: Implementation schedules were developed using current and projected budget allocations and tracked implementation rates as a result of state regulations and voluntary participation. Projected statewide implementation n schedules emphasize cost effective practices and the need to continue to pursue additional state and federal funding to increase implementation rates.

Agriculture Implementation Schedule (continued)



Note: Implementation schedules were developed using current and projected budget allocations and tracked implementation rates as a result of state regulations and voluntary participation. Projected statewide implementation schedules emphasize cost effective practices and the need to continue to pursue additional state and federal funding to increase implementation rates.

Implementation Schedule

				5-Year Implementation Schedule	
Practice	**Units**	**Strategy Goal**	**Progress Through 2004**	**1-2 Year Goal**	**3-5 Year Goal**
Soil Conservation and Water Quality Plans*	ac	1,364,718	757,248	-100,000	-150,000
Conservation Tillage	ac/yr	718,037	747,655	665,037	665,037
Cover Crops, Small Grains, and Alternative Crops					
Cover Crops	ac/yr	600,000	52,328	230,000	230,000
Commodity Cover Crops	ac/yr	150,000	0	50,000	50,000
Alternative Crops	ac/yr	50,000	0	0	3,500
Animal Waste Management Systems					
Livestock	systems	2,023	1,056	50	75
Poultry	systems	1,247	1,075	50	75
Runoff Control	systems	1,092	715	40	60
Pasture BMPs					
Off-Stream Watering w/Fencing	ac	11,505	1,642	300	450
Off-Stream Watering w/o Fencing	ac	29,748	26,895	600	900
Nutrient Management, % Treated	%	100%	80%	100%	100%
Precision Agriculture	ac	300,000	0	0	100,000
Retirement Programs					
Forest Buffers	ac	32,506	17,836	500	780
Grass Buffers	ac	60,764	33,708	8,000	12,000
Wetland Restoration	ac	16,678	6,448	300	450
Retirement of Highly Erodible Land	ac	28,922	12,251	4,000	6,000
Tree Planting - Agriculture	ac	10,712	8,051	200	300
Ammonia Emissions Reduction	houses	740	0	12	300
Phytase Feed Additive (% reduction)	%	32%	16%	30%	32%
Manure Transport (tons)**	tons/yr	70,000	36,730	75,000	75,000
Horse Pasture Management	operations	7,040	0	50	150

Notes for the Implementation Schedule (on previous page):

* Soil Conservation and Water Quality Plans are developed every 10-years. The negative value reflects the expectation that current levels of plan development cannot be maintained with projected funding and/or staffing.

** Estimates for the 5-year implementation schedule are based on projected funding from known sources, tracked implementation rates as a result of regulation and voluntary participation, and feedback from the local level on the feasibility of implementation in the near-term.

Conservation Tillage: A potentially significant percentage of Maryland's conservation tillage acres may qualify as "No Till," yielding greater (but currently uncredited) benefits.

Nutrient Management: In Maryland, nutrient management plans are applied to pasture land, but these acres are not incorporated in the Chesapeake Bay Program's model framework to date.

Precision Agriculture: The Chesapeake Bay Program models this BMP as an alternative to nutrient management and subtracts reported precision agriculture acres from total Nutrient Management Plan Implementation (NMPI).

Mixed Open Nutrient Management: The Chesapeake Bay Program applies nutrient management to all mixed open acres without horse pasture management.

Horse Pasture Management: Maryland's strategy is to establish 7,040 systems based on an averaged number of acres per place or per system.

Current Programs

Implementing the Strategy

Maryland Agricultural Water Quality Cost-Share (MACS) Program

MACS was established by State law in 1984 to help farmers control nutrient runoff and protect water quality and natural resources on their farms and comply with Federal and State environmental regulations. MACS provides farmers with grants to cover up to 87.5% of the cost to install BMPs on their farms to control soil erosion, manage nutrients, and safeguard water quality. A maximum funding level of up to $20,000 per project and $50,000 per farm applies. Farmers receiving MACS funds for animal waste treatment and containment projects may receive up to $75,000 per project with a maximum of $100,000 per farm when combined with other BMPs. In many instances, MACS and U.S. Department of Agriculture (USDA) funds may be combined.

Cover Crop Program

The Cover Crop Program provides cost-share assistance to farmers to implement this BMP. Cover crops absorb unused crop nutrients remaining in the soil following the fall harvest and act as a ground cover to keep the soil from eroding during the winter months. Maryland continues to refine the program, providing tiered incentives in 2004 to encourage early planting, which maximizes nutrient uptake. Cost-share support is administered through MACS.

Soil Conservation and Water Quality Program

This program helps farmers and landowners develop plans featuring a menu of BMPs uniquely suited to each site. Soil Conservation District staff provide technical assistance to develop these plans and design and implement BMPs, which helps farmers and landowners protect natural resources while maintaining production goals. Farmers are also advised about funding assistance and apprised of new research and technologies in land and water management.

Maryland Nutrient Management Program

This program provides financial and technical assistance to farmers to help them meet requirements of the Water Quality Improvement Act. Farmers who have a gross income of $2,500 or more or who have 8,000 pounds or more of animals must have a nutrient management plan. It also requires University of Maryland fertilizer management guidelines to be followed for nutrient application on certain non-agricultural lands. Nutrient management plans address the timing, application, and management of all nutrient sources used in the farming operation. The Maryland Department of Agriculture (MDA) certifies and licenses private and public sector nutrient management consultants who provide technical assistance in the development and implementation of nutrient management plans. Maryland Cooperative Extension develops nutrient management plans for farmers and trains consultants and farmers to become certified planners, enabling farmers to prepare their own plans. Cost-share for private sector development of plans is available from MACS or the Environmental Quality Incentives Program (EQIP).

Maryland Manure Transport Program

This program provides cost-share assistance of up to $20 per ton to transport manure from animal operations with excess waste or documentation of phosphorus over-enrichment to farms where it is land applied in accordance with a nutrient management plan or for alternative uses. Poultry companies provide a 50% match for litter transported from their growers farms. Cost-share support is administered through MACS.

Environmental Quality Incentives Program (EQIP)

EQIP provides financial assistance of up to 75% for the installation of BMPs, with a maximum of $450,000 for any individual or eligible entity through 2007. Approximately 60% of the funds are directed to livestock related conservation practices. Funds are also available to address locally identified conservation concerns. Contracts are from 1- to 10-years in length. The program is administered by the Natural Resource Conservation Service (NRCS) through local Soil Conservation Districts. Projects may be co-cost-shared with MACS Program support.

Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP)

The USDA administers these programs. They are designed to set aside and implement conservation measures to protect highly erodible land and other sensitive farmland

for a period of 10- to 15-years. CREP also targets the creation of riparian buffers and wetland restoration. The State also offers cost-share through the MACS Program for installation of BMPs and may purchase easements under CREP.

Conservation Security Program (CSP)

This program supports ongoing conservation stewardship of agricultural lands by providing assistance to producers to maintain and enhance natural resources. Administered through NRCS, it provides tiered payments to qualified farmers who are managing natural resources on their farms to achieve certain levels of soil and water quality as well as other identified natural resource objectives. Cost-share is also available to enhance current conservation efforts. Farmers in the Chester-Sassafras and Monocacy watersheds are eligible for this program in 2005.

Wetland Reserve Program (WRP)

NRCS administers this program to provide financial incentives to landowners seeking to restore nontidal wetlands. Payment includes compensation for a wetland easement as well as cost-share funding to restore wetlands. There are three options for participants — permanent easements, a 30-year easement, and a restoration cost-share agreement.

- Permanent easements are conservation easements in perpetuity. USDA pays for the easement as well as 100% of the cost of restoring the wetland.

- A 30-year easement is a conservation easement lasting for 30-years. USDA pays 75% of what would be paid for a permanent easement as well as 75% of restoration costs.

- A restoration cost-share agreement is an agreement to reestablish a degraded or lost wetland habitat. USDA pays 75% of the restoration costs. This does not place an easement on the property. The landowner provides the restoration site without reimbursement and agrees to maintain it for a minimum of 10-years.

Low Interest Loans for Agricultural Conservation (LILAC) Program

This program is available to help farmers install BMPs or purchase equipment to protect natural resources and safeguard water quality. Loans offered through the LILAC program can help farmers bridge the cost-share gap that exists in many

Conservation tillage involves leaving stalks and leaves from the previous crop on the ground's surface before and during planting to protect the soil from erosion.

government conservation incentive programs. These loans are guaranteed by the State Revolving Loan Fund and are available at lending institutions throughout the State.

Operation and Maintenance Plans for Public Drainage and Public Watershed Associations

These plans outline upkeep activities that the Public Drainage Association intends to perform for a 2- to 3-year period. These activities are designed to minimize the environmental impacts of agricultural drainage ditches while maintaining functioning drainage systems. Public drainage systems were created to reduce flooding, to address landowners' drainage needs, to protect public health, and to improve the transportation infrastructure while supporting local economies. Cost-share assistance for the installation of several eligible BMPs for drainage ditches may be available from MDA.

Rural Abandoned Mine Program (RAMP)

NRCS administers this program. The district conservationist is in charge of this land reclamation program on a county-wide basis, and Soil Conservation Districts are involved in the design, approval, and inspection of implemented BMPs to assure their performance as specified by law.

Implementation Barriers and Possible Solutions

Cover and Alternative Crops:	
Barriers to Implementation	**Solutions to Overcome Barriers**
• It is not practical to have more than 70% of cropland in conservation tillage. Farmers with a corn/wheat rotation must till once every 4- to 5-years to avoid a fungus problem. • Farmers need more flexibility with cover crops and a larger window in which to plant them. • The cap on the number of cover crop acres per operator that are eligible for cost-share may limit participation by some farmers. • There is a lack of funding or program support for the commodity cover crops BMP. • Alternative crops are not attractive to landowners because there is no market for them.	• The State should explore if removing the cap on the number of acres planted with cover crops will increase acres enrolled. • The State could create more flexible rules for cover crops and forgo the higher uptake. • State or local funding for the Commodity Cover Crop Program may increase acres planted. Additionally, an ethanol plant in Maryland would create a market for the crops. • The State could assist in creating the necessary infrastructure and funding source for a successful alternative crops program.

Animal Waste Management:	
Barriers to Implementation	**Solutions to Overcome Barriers**
• Often landowners with horses do not perceive themselves as part of the agricultural community, complicating the implementation of Horse Pasture Management Programs.	• Federal, State, and local governments and Soil Conservation Districts should reach out to these landowners to help educate them about the impact of their operations. Additionally, a funding mechanism for assuring adequate staff and program implementation would aid this process.

Land Retirement:	
Barriers to Implementation	**Solutions to Overcome Barriers**
• Most of the available land has already been used for a retirement BMP, and landowners are concerned about taking additional land out of production. • Unlike other retirement BMPs, conversion of lands to wetlands involves a permanent change in land use.	• Consider allowing the harvest of grassed buffers to encourage landowners to plant more.

Agriculture Conservation Plans:	
Barriers to Implementation	**Solutions to Overcome Barriers**
• There are insufficient funds and personnel to implement the Nutrient Management and Soil Conservation and Water Quality Plan Programs.	• In addition to Soil Conservation District staff requirements in the Code of Maryland Regulations, increased staffing and resources for the State and Soil Conservation District agricultural programs are necessary to meet ambitious implementation goals.

Innovative Practices:	
Barriers to Implementation	**Solutions to Overcome Barriers**
• Precision agriculture is not fully evolved or adapted for Maryland conditions, implementation is expensive, fertilizer application tools are not available, and its current usefulness is limited to large operations.	• The Federal and State governments should fund more research in the field. • Precision agriculture needs to be compatible with farmer and fertilizer applicator equipment.

State Initiatives to Address the Implementation Gaps

2-Year Action Plan

These initiatives are organized by the agency that will be responsible for implementing them. Many of these initiatives, however, will require the cooperation and coordination of several State agencies, local governments, and other stakeholders.

MDA will implement the following actions:

- Increase MDA funds to cost-share the expense of transporting excess manure from farms and regions to areas where manure nutrients can be used under the guidance of a nutrient management plan.

- Expand the Cover Crop Program. Cover crops are a cost effective BMP with an established and proven track record for implementation results. This initiative proposes an increase to MDA's cover crop funding that, when added to the existing program, will achieve nearly 50% of the Tributary Strategy implementation goal for this practice. Funding from this initiative would also provide resources to implement cover crops on lands owned by or under easement with DNR as part of the State's effort to lead by example.

- Establish a Commodity Cover Crop Program that will allow the winter crop to be harvested and sold as a commodity. This program will provide an incentive to eliminate fall fertilization of commodity grains. This will increase the farm community's participation, resulting in more acres being planted.

- MDA will continue to look for opportunities, such as grant funds for staff dedicated to address small horse operations of less than eight horses at a demonstration level. MDA has extended the eligibility of the MACS Program to

Cover crops, such as rye, wheat, and barley, are planted during the fall to reduce soil erosion and take up crop nutrients left over from the previous crop.

include horse operations with eight or more animals. MDA will work with local Soil Conservation Districts to implement this action.

- MDA will work with the University of Maryland, Maryland Cooperative Extension, local Soil Conservation Districts, and NRCS to conduct management demonstrations and research in ammonia emission reduction.

- Work with the dairy industry to develop alternative manure management systems. This will assist in compliance with phosphorus-based nutrient management plans. MDA will be the lead agency, working with the Soil Conservation Districts, NRCS, and the University of Maryland.

- Work with the Chesapeake Bay Program to account for water quality benefits achieved by implementing BMPs on public drainage systems. These BMPs have water quality and other environmental benefits that have not been credited in the Chesapeake Bay Program's watershed model.

- Continue to work with the nursery industry on water management and issues related to nutrient management as a means of assuring proper control of nutrients from this sector.

- Continue to maintain and manage public drainage associations in a cost effective and environmentally sensitive manner.

- Conduct a demonstration of Management Intensive Grazing Systems for dairy production designed to improve pastures and forage resources to support the majority of a herd's nutritional needs. Management Intensive Grazing reduces dependence of off-farm feed inputs and helps achieve a nutrient balance or closed system. The purpose of the project is to demonstrate and promote the adoption of this approach to protect or improve water quality, soil quality, and grazing land health while sustaining productivity and the economic viability of dairies.

DNR will implement the following actions:

- Coordinate a DNR Stream Restoration Program that focuses stream corridor restoration in agricultural areas using low cost, highly effective practices that improve water quality. This program would be coordinated with MDA, MDE, and local Soil Conservation Districts utilizing existing and new sources of funds.

- Assess opportunities to expand the use of manure products on State-owned lands and replace the use of commercial fertilizers. DNR-owned agricultural lands will be assessed first with a Phase II assessment of all State lands following. If needed, requirements will be revised to allow for the use of manure-based products on DNR-owned agricultural lands.

- Require all operators leasing State row crop land to apply to the State Cover Crop Program in addition to

Maryland farmers use nutrient management plans to help prevent over-fertilization of crop fields. The plans, which are required by law, balance crop nutrient needs with fertilizer applications.

implementing their approved nutrient management plan. This would only apply to operators and lands eligible for the State Cover Crop Program, as funding may not be available for all State-owned lands, and will be targeted to lands where poultry litter is applied.

- Encourage the planting of cover crops on all easements funded by DNR land preservation programs. This rule change should be consistent with Maryland Agricultural Land Preservation Fund requirements. This would only apply to operators and lands eligible for the State Cover Crop Program as funding may not be available for all State-owned lands. Cover crops will be targeted on all State lands where poultry litter is applied.

- Continue to pursue increasing DNR Program Open Space funds for CREP easements. Not to exceed 25,000 acres for each easement type and a total of 100,000 acres.

The University of Maryland will implement the following actions:

- Sign Memorandum of Understanding with the USDA Agricultural Research Service; the EPA Chesapeake Bay Program; MDA; and USDA Cooperative State Research, Education, and Extension Service (CSREES) Mid-Atlantic Water Quality Program for coordination on research, education, and establishment of priorities for agricultural management related to the Chesapeake Bay goals.

- Provide technical support to NRCS for approval of animal diet modification standards for EQIP funding in Maryland and develop an extension and outreach program on diet modification and overfeeding.

- Identify gaps and develop research recommendations on the impacts of ammonia emissions from animal farms. Identify and implement demonstration projects of promising management tools in cooperation with NRCS.

- Evaluate and demonstrate opportunities to manage excess manures in cooperation with USDA, industry, MDA, and Mid-Atlantic land grant universities.

- Conduct research and demonstrations of enhanced nitrogen use efficiency for

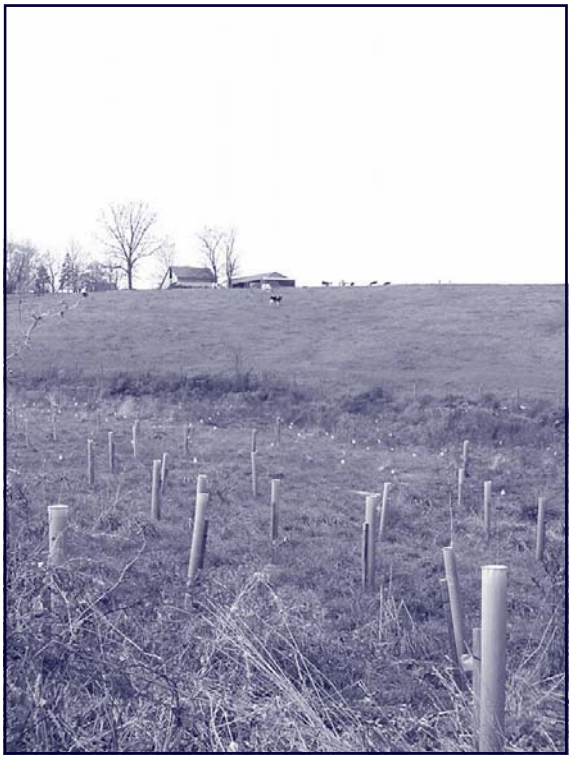
crop production, including cover crops, while assuring their economic sustainability.

- Develop precision agriculture and nutrient use efficiency demonstration and monitoring projects for Maryland and the Mid-Atlantic region in coordination with industry and State agencies. The University of Maryland will coordinate this initiative with MDA, the Soil Conservation Districts, and other interested stakeholders.

- Assist with identification and analysis of opportunities in the Farm Bill for additional or targeted funding for conservation. The University of Maryland will coordinate this initiative with MDA and the Soil Conservation Districts.

- Implement a program to improve dairy herd nutrition using milk urea nitrogen. Milk urea nitrogen has been shown to be an excellent predictor of nitrogen excreted directly into dairy cow manure. Milk urea nitrogen can be used to identify herds that are overfed protein, and routine milk urea nitrogen analysis can help producers fine tune feed management and reduce the nitrogen excreted to manure. Currently, despite the promise of milk urea nitrogen analysis, there remain obstacles to its widespread adoption in the field. These barriers include milk laboratories' skepticism of the value of milk urea nitrogen analysis and a lack of understanding of the process and its value on the part of producers. The ultimate goal of this project is to reduce nitrogen losses to air and water from dairy farms in the Chesapeake Bay region by improving dairy herd nutrition. Milk urea nitrogen analysis will be institutionalized in milk laboratories and dairy operations, and an innovative incentive program will be established to encourage producers to reduce nitrogen lost to the environment by decreasing nitrogen feeding.

- Utilize conservation tillage to minimize nutrient losses from poultry litter applied in grain production systems. A recent economic analysis confirmed that application of broiler litter as a fertilizer to crop land is the highest value use of the litter generated on the Delmarva Peninsula. The amount of phosphorus applied with manure usually has not been considered when determining



Stream protection with fencing re-establishes stream banks that have been eroded by animal traffic with vegetation.

recommended application rates. In these situations, soil phosphorus concentrations can increase rapidly. Recent research that examined phosphorus in manure-amended Atlantic Coastal Plain soils suggest that the Chesapeake Bay and its tributaries are more vulnerable to receiving excess phosphorus from surface runoff than from leaching. This same research concluded that the primary focus of phosphorus management efforts should be minimizing loss through surface runoff pathways coupled with monitoring the degree of phosphorus saturation of surface soils. The purpose of this project is to demonstrate that existing conservation tillage technology can be successfully used to partially incorporate poultry litter in reduced tillage grain production systems, preserving surface residue and soil conservation conditions while reducing nitrogen and phosphorus losses compared to no-till production systems. This nutrient management approach will be demonstrated and evaluated on 10 to 12 farms across the Delmarva Peninsula.

5-Year action Plan

These initiatives are organized by the agency that will be responsible for implementing them. Many of these initiatives, however, will require the cooperation and coordination of several State agencies, local governments, and other stakeholders.

MDA will implement the following actions:

- Implement soil conservation and water quality planning by reinstating staff positions and the necessary budget.
- Implement runoff control. This is based on retrofitting poultry operations to meet new concentrated animal feeding operation (CAFO) requirements.
- Increase the retirement of highly erodible land. This is contingent on the reauthorization of the CREP Program.
- Implement grass buffers. This is contingent on the reauthorization of the CREP Program.
- Install riparian forest buffers. This is contingent on the reauthorization of the CREP Program.
- Increase wetland restoration. This is contingent on the reauthorization of the CREP Program.
- Improve horse pasture management. MDA will continue to look for opportunities, such as grant funds for staff dedicated to address this issue at a demonstration level.
- Implement ammonia emission reductions. This is based on funding and the EPA's new air emission initiative for agricultural operations. MDA will work with the University of Maryland to implement this initiative.
- Pilot precision agriculture. MDA will explore opportunities for tax incentives/ write-offs (i.e., equipment purchase as

well as incentive costs for sampling, yield monitoring, and consultation services).

- Encourage alternative crops. MDA will explore market development and infrastructure needs to promote these crops.

- Support oyster aquaculture. MDA will continue to look for opportunities, such as grant funds for staff dedicated to address this issue at a demonstration level. Water quality benefits for this practice need to be assessed and monitored by DNR and the Chesapeake Bay Program.

DNR will implement the following actions:

- Encourage landowners whose conservation easements were purchased with State funds to implement BMPs and restoration programs. Direct existing funds when possible and seek to obtain specific funds to initiate BMPs and restoration programs on these lands. This initiative would educate and offer a menu of land use conservation programs to these landowners.

The University of Maryland will implement the following actions:

- Partner with USDA/Agricultural Research Service (ARS) – Mid-Atlantic land grant institutions on precision feeding diet demonstrations for dairy and beef cattle.

- Develop education and outreach activities in coordination with USDA/ARS bioenergy research and demonstration in the Chesapeake Bay, focusing on dairy anaerobic digestion and energy from manure.
- Evaluate economically viable alternative

Livestock Animal Waste Management Systems include manure storage structures that protect animal waste from rainwater runoff and allow manure to be recycled as a fertilizer when field conditions are right.

crops or crop/animal production systems with lower nutrient impacts than current systems.

Long-Term Action Plan

These are long-term initiatives for education, policy, and restoration needs to meet Bay water quality standards. These initiatives are organized by the agency that will be responsible for implementing them. Many of these initiatives, however, will require the cooperation and coordination of several State agencies, local governments, and other stakeholders.

MDA will implement the following actions:

- Continue to pursue, demonstrate, and promote alternative technologies and management measures to deal with manure management issues and nutrient reduction strategies.
- Assure long-term agricultural viability while implementing management measures that minimize and reduce nutrient impacts.
- Continue to implement and adapt a broad range of technical and financial assistance programs that support a variety of agricultural BMPs in order to address different types of farm operations and site-specific conditions.
- Continue to work with the University of Maryland and the research community to improve BMP effectiveness and to develop new or innovative tools that reduce nutrient impacts from agriculture and restore the Chesapeake Bay.
- Utilize a strong network of outreach and education activities to promote the adoption of agricultural BMPs.

Stakeholder Roles in Implementing the Strategy

Private Landowners

- Finance and implement BMPs to address site-specific nutrient and sediment issues on their property.

Business and Industry

- The dairy industry needs to be a partner in feed formulation and dietary modifications as well as alternative manure management.
- The poultry industry needs to provide incentives and encouragement for diet modification, ammonia emission reductions, and manure management.
- The grain industry needs to participate in precision agriculture and enhanced nitrogen use efficiency.

State Government

- Provide staff and funding to Soil Conservation Districts for technical assistance to farmers and landowners for the implementation of BMPs.

Federal Government

- Provide staff and funding to Soil Conservation Districts for technical

assistance to farmers and landowners for the implementation of BMPs.

Local Governments

- Provide staff and funding to Soil Conservation Districts for technical assistance to farmers and landowners for the implementation of BMPs.

Soil Conservation Districts

- Provide technical assistance and guidance on programs available to farmers and landowners for the implementation of BMPs and coordinate activities and funding between district, State, and Federal programs.

Soil Conservation and Water Quality Plans provide farmers with site specific solutions to prevent soil erosion and protect water quality.